The CALS Test Network MIL-D-28003 CGM Test Packet

November 25, 1991

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Prepared for
Air Force Logistics Command

Prepared by
Lawrence Livermore National Laboratory

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ATTACHMENTS

Preface

This CALS Test Network MIL-D-28003 (CGM) Test Packet is a document which will have periodic updates. These will occur as the reference images and their associated procedures, scripts, and files are corrected for oversights and/or are updated to new versions of the standards.

We acknowledge the following people for their technical assistance: Phil Andrews, Pittsburgh Supercomputing Center; Lofton Henderson, Henderson Software.

Please use the information contained in this packet at your own risk. Send recommendations for change or comments about the content to:

<div align="center">

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Abstract

This CALS Test Network MIL-D-28003 (CGM) Test Packet, together with the floppy disk described in Attachment A, contains information useful in conducting tests of the military specification MIL-D-28003 using CGM interpreters. The use of this material helps evaluate and demonstrate industry's and government's use of MIL-D-28003 in accordance with the CALS initiative. The CALS Test Network (CTN), the organization tasked with testing and demonstrating the CALS digital data interchange standards among industry and government, will use this packet in the tests that it conducts. The results derived from this testing will allow the CTN to suggest modifications to vendors' CGM software, the ANSI/ISO standard for CGM, and most importantly, the MIL-D-28003 military specification. However, the greatest use of this test packet is expected to be by industry and Service components as they test and evaluate their own CALS CGM capabilities independently of the CTN.

1   Introduction

The CALS Test Network (CTN) is a Department of Defense (DoD) and industry consortium within the Computer-aided Acquisition and Logistic Support (CALS) Program. It is tasked with testing and demonstrating the interchange of digital technical information using the CALS standards in user applications.

The CTN will use the Graphical Primitive elements reference Computer Graphics Metafile (CGM) described herein during transfer testing of CGM data. Specifically, this reference CGM (reference metafile) demonstrates the use of the CGM elements identified in the military specification MIL-D-28003. The results derived from this testing will allow the CTN to suggest modifications to vendors' CTN software, the ANSI/ISO standard for CGM, and most importantly, the MIL-D-28003 military specification, itself. However, the greatest use of this test packet is expected to be by industry and Service components as they test and evaluate their own CAL CGM capabilities independently of the CTN.

MIL-D-28003 defines a major subset of the ISO 8632 (CGM) standard format to be used for interchanging 2-dimensional (2-D) graphical data between dissimilar system. The CALS standards indicate that this subset is the preferred format for the interchange of technical publication illustrations; it is also beginning to be used for transferring 2-D engineering drawings.

2 Scope

The CTN Graphical Primitive Elements reference CGM is a metafile which contains instances of the 18 CGM primitives allowed by MIL-D-28003. While each allowable primitive is represented, some attribute elements are not covered. For example, the Graphical Primitive Elements reference metafile does not test an interpreter's ability to handle minimum and maximum values, to render all line types and hatch styles, to handle clipping, bundling, and escape elements, or to parse and skip any elements that the interpreter does not support. Later versions of this test packet will extend the scope.

It cannot be stressed enough that the purpose of CTN testing and of this test packet is to evaluate and demonstrate industry and government use of MIL-D-28003 and not to validate conformance of generators, interpreters, or metafiles to MIL-D-28003. The former testing is really "field" testing of the standard itself in an attempt to discover ambiguities and inconsistencies revealed by implementations. The latter testing validates specific files or interpreters/generators and in effect "guarantees" that they conform to MIL-D-28003; this type of testing is not within the CTN charter.

3   Technical Content of the MIL-D-28003 (CGM) Test Packet

The CTN MIL-D-28003 CGM Test Packet you are currently reading contains a set of reference materials that may be used to execute a test involving a vendor's CGM interpreter. It contains:

1. A listing of the contents of the CGM Test Packet Floppy Disk.

2. An illustration of how the Graphical Primitive Elements reference metafile should look.

3. A chart of the attributes used in the Graphical Primitive Elements reference metafile .

4. Procedures to follow in conducting a CGM interpreter test.

5. A floppy disk containing four different forms of the CTN Graphical Primitive Elements reference metafile.

6. An evaluation script (sets of questions) to complete after the Graphical Primitive Elements reference metafile has appeared on the screen.

7. A paper printout of the clear text forms of the Graphical Primitive Elements reference metafile. This is included for reference only.

8. A glossary listing.

9. A list of Acronyms and Abbreviations used.

With the exception of item 5, the floppy disk, the above-mentioned materials are contained in Attachments A through H.

4 Technical Content and Creation of the Reference Material

4.1 The CTN Graphical Primitive Elements Reference Metafile

The CTN Graphical Primitive Elements reference metafile is comprised of all the geometric and many of the annotation CGM elements identified in the MIL-D-28003 specification. The illustration is organized so the elements reside individually by element within one box of a grid. This grid box is labeled to show which element it should contain.

4.2 Development of the Reference CGMs

Both the real and integer forms of the Graphical Primitive Elements reference metafile were hand-created as clear text files, then translated into binary files via GPLOT, a copyrighted program available at no cost from Pittsburgh Supercomputing Center by downloading it over Internet. This hand-editing produced CGM files that incorporate all MIL-D-28003 graphical primitive elements and pass ValidCGM and MetaCALS CGM analyzers with no accountable errors.

One difficulty with designing a test CGM is the breadth of correct interpretations. For example, the description of the Restricted Text element states that the text must fit into a box, but does not describe how the text must fit. Therefore text which fits inside the box as closely as possible is as legal as text which fits anywhere inside the box. This yields different visual representations from the same CGM, which complicates a visual inspection for correctness. Future versions of the standard will not contain these ambiguities.

4.3 The Script

The test packet contains a script which describes how to evaluate the resulting illustration. The script asks questions that try to address DoD's present requirements for transfer of digital illustration data. Another evaluation aide, the CALS Test Network Transfer Test Procedure Checklist, is available separately from the CTN.

5   Conclusion

By following the procedures described in this CTN MIL-D-28003 (CGM) Test Packet and by referring
to the script, plot, and data lists contained within, one can examine digital illustration transfers using
CGM and MIL-D-28003. This packet does not validate a vendor's conformance to MIL-D-28003, but
instead allows the CALS Test Network to demonstrate and evaluate industry/government use of the
MIL-D-28003 specification. The packet is also useful to industry and Service components for
independent evaluation of their internal MIL-D-28003 capabilities.

ATTACHMENT A   Contents of the CTN MIL-D-28003 (CGM) Test Packet Floppy Disk

The floppy disk included with this CTN MIL-D-28003 (CGM) Test Packet contains four files, each a different representation (form) of the same image. These are version "D" of the reference metafiles.

CTN-01i.clr   This is a clear text CGM of the integer version of the Graphical Primitive Elements reference metafile. It is not a legal MIL-D-28003 file because it is not a binary format file. The binary version, CTN-01i.cgm, was translated from this file using GPLOT.

CTN-01i.cgm   This is the binary CGM of the integer version of the Graphical Primitive Elements reference metafile, created by translation from the clear text CGM, CTN-01i.clr. This metafile is a MIL-D-28003 file.

CTN-01r.clr   This is a clear text CGM of the real version of the Graphical Primitive Elements reference metafile. It is not a legal MIL-D-28003 file because it is not a binary format file. The binary version, CTN-01r.cgm, was translated from this file using GPLOT.

CTN-01r.cgm   This is the binary CGM of the real version of the Graphical Primitive Elements reference metafile, created by translation from the clear text CGM, CTN-01r.clr. This metafile is a MIL-D-28003 file.
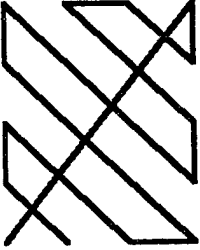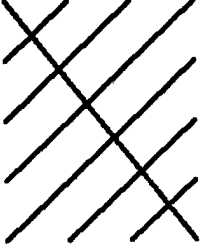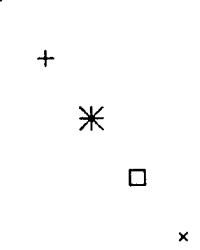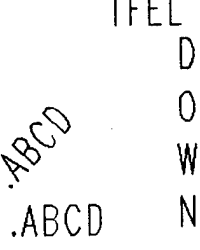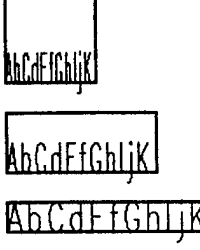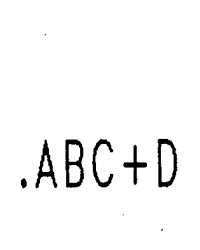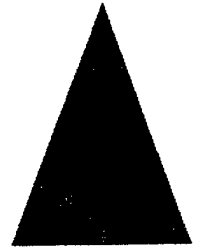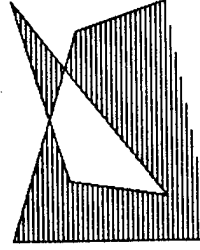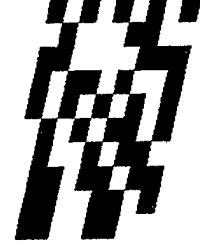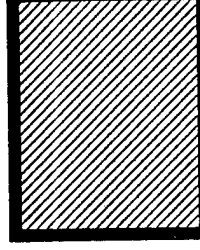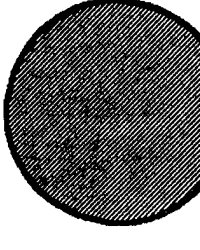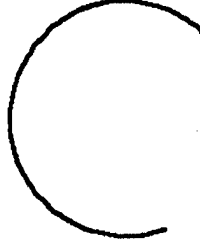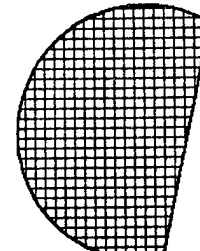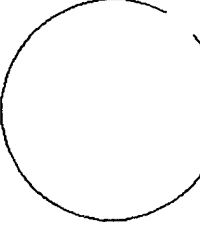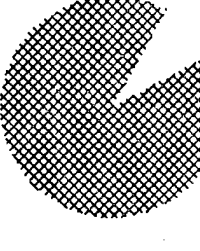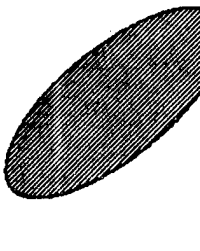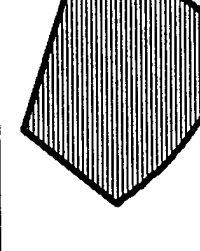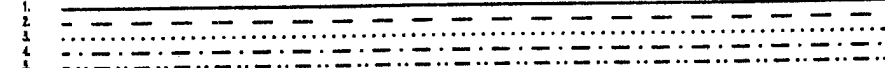
These files include the eighteen graphical primitive elements of CGM that are allowed under MIL-D-28003. Each is displayed in one of eighteen boxes in a three by six array. Only minimal use is made of attribute elements such as LINE WIDTH, LINE COLOUR, LINE TYPE, EDGE WIDTH, EDGE COLOUR, and EDGE TYPE. The eighteen boxes are numbered 1-9 and 11-19. Box 10, corresponding to the GENERALIZED DRAWING PRIMITIVE element, is not included since this element in not permitted by MIL-D-28003.

Text size and spacing were adjusted to give good appearance with one interpreter and may not "fit" as well when viewed with other CGM interpreters.

ATTACHMENT B　　　**Illustration of the CTN Graphical
Primitive Elements Reference Metafile**

Note: This plot incorrectly shows a square as one of the polymarkers. The square should be a circle. Also, the fill pattern in the circle and the ellipse are incorrect as shown.

(1) POLYLINE	(2) DISJOINT POLYLINE	(3) POLYMARKER	(4) TEXT	(5) RESTRICTED TEXT	(6) APPEND TEXT
(7) POLYGON	(8) POLYGON SET	(9) CELL ARRAY	(11) RECTANGLE	(12) CIRCLE	(13) CIRCULAR ARC 3 POINT
(14) CIRCULAR ARC 3 POINT CLOSE	(15) CIRCULAR ARC CENTRE	(16) CIRCULAR ARC CENTRE CLOSE	(17) ELLIPSE	(18) ELLIPTICAL ARC	(19) ELLIPTICAL ARC CLOSE

LINE TYPE

1.
2.
3.
4.

CALS TEST NETWORK
MIL-D-28003
Computer Graphics Metafile
File: CTN-01ld, Draft 91-10-03

ATTACHMENT C   **Attributes of the CTN Graphical
Primitive Elements Reference Metafile**

This plot shows the attributes used in each grid section. It is included to assist visual inspection of the CGM.

OPEN FIGURE:
LINE:
  Type.: solid
  Width: 4
  Color: red
 	
(1) POLYLINE
	OPEN FIGURE:
	LINE:
	  Type.: solid
	  Width: 3
	  Color: green
	
	(2) DISJOINT
	    POLYLINE
		Marker:
		Mark Size Color
		  . 1 black
		  + 2 red
		  * 3 green
		  o 2 blue
		  x 1 magenta
		
		(3) POLYMARKER
			TEXT ELEMENT:
			Font:
			  SIMPLEX_ROMAN
			String Orient Color
			.ABCD Right magenta
			.ABCD Diag orange
			LEFT Left cyan
			DOWN Down blue
			
			(4) TEXT
				TEXT ELEMENT:
				Font:
				  SIMPLEX_ROMAN
				CharHeight 0.02
				CharSpace 0.25
				Color: blue
				
				(5) RESTRICTED
				    TEXT
					TEXT ELEMENT:
					CharSpace 0.25
					'.ABC'
					  DUPLEX_ROMAN
					  Height: 0.02
					  Color: red
					'+D'
					  COMPLEX_ROMAN
					  Height: 0.03
					  Color: blue
					
					(6) APPEND
					    TEXT

CLOSED FIGURE:
Edge —
  Type: solid
  Width: 2
  Color: blue
  Vis: on
Fill —
  Type: solid
  Pattern: n/a
  Color: yellow
 	
(7) POLYGON
	CLOSED FIGURE:
	Edge —
	  Type: solid
	  Width: 2
	  Color: black
	Fill —
	  Type: hatch
	  Pattern:
	    Vert lines
	  Color: yellow
	
	(8) POLYGON
	    SET
		r . g . b . y . m
		. c . . . . r r . .
		g c . . . . b r r
		g . r r . c . . c
		g . g . b . m . m
		. r . g . m m . c
		. g . . y . m g .
		. b b . y g . b y
		. y y . . g b . c
		. m m . . g y . .
		
		(9) CELL
		    ARRAY
			CLOSED FIGURE:
			Edge —
			  Type: solid
			  Width: 10
			  Color: cyan
			Fill —
			  Type: hatch
			  Pattern:
			    Diag lines //
			  Color: magenta
			
			(11) RECTANGLE
				CLOSED FIGURE:
				Edge —
				  Type: solid
				  Width: 4
				  Color: green
				Fill —
				  Type: hatch
				  Pattern:
				    Diag lines \\
				  Color: blue
				
				(12) CIRCLE
					OPEN FIGURE:
					LINE:
					  Type.: solid
					  Width: 1
					  Color: green
					
					(13) CIRCULAR
					    ARC 3 POINT

CLOSED FIGURE:
Edge —
  Type: solid
  Width: 2
  Color: yellow
Fill —
  Type: hatch
  Pattern: Xhatch
    Vert/Horiz
 	
(14) CIRCULAR
    ARC 3 POINT
    CLOSE
	OPEN FIGURE:
	LINE:
	  Type.: solid
	  Width: 1
	  Color: green
	
	(15) CIRCULAR
	    ARC CENTRE
		CLOSED FIGURE:
		Edge —
		  Vis: OFF
		  Width: 2
		  Color: blue
		Fill —
		  Type: hatch
		  Pattern: Xhatch
		    Diag/Diag
		
		(16) CIRCULAR
		    ARC CENTRE
		    CLOSE
			CLOSED FIGURE:
			Edge —
			  Type: solid
			  Width: 2
			  Color: magenta
			Fill —
			  Type: hatch
			  Pattern:
			    Diag lines \\\
			
			(17) ELLIPSE
				OPEN FIGURE:
				LINE:
				  Type.: solid
				  Width: 6
				  Color: GREEN
				
				(18) ELLIPTICAL
				    ARC
					CLOSED FIGURE:
					Edge —
					  Type: solid
					  Width: 4
					  Color: magenta
					Fill —
					  Type: hatch
					  Pattern:
					    Vert lines |||
					
					(19) ELLIPTICAL
					    ARC CLOSE

LINE TYPE

    Line types: 1 solid, 2 dash, 3 dot, 4 dash-dot, 5 dash-dot-dot.
    Line color: red   Line width: 2

CALS TEST NETWORK
MIL-D-28003
Computer Graphics Metafile
File: CTN-01Rd/key, 91-10-02

ATTACHMENT D — Procedures for Executing the CTN Reference CGM Interpreter Test

1. Receive a floppy disk from the CALS Test Network containing the CTN Graphical Primitive Elements reference CGMs in MIL-D-28003 format.

2. Process the binary files through your CGM interpreter.

3. Inspect the resulting illustrations and answer the questions listed in the evaluation script (Attachment E). If you answer "no" to any of the questions, explain why on the incident report sheets which follow the script. Attach additional sheets if necessary.

4. Generate a hard copy plot of CTN-01i.cgm and CTN-01r.cgm.

5. If you are conducting a self-test, collect the script, plot, and any incident reports for self-evaluation. If you pre-arranged a formal CTN test and obtained CTN approval, send the completed evaluation script, plot, and any incident reports to the CALS Test Network Office Test Bed.

6. Evaluate the data. The CALS Test Network will, and anyone conducting a self-test should:

   a. Examine the incident reports, plot, and evaluation script.

   b. Pinpoint processor, CGM standard (ISO 8632), and/or military standard (MIL-D-28003) anomalies.

   c. Bring the findings to the appropriate parties for correction (vendor, user, CGM Committee, or sponsor of the military standard).

   On CTN-arranged tests, the CTN will publicly publish results of findings.

ATTACHMENT E   CTN Graphical Primitive Elements
Reference Metafile Evaluation Script

For all elements, check visually against the supplied illustration of the CTN Graphical Primitive Elements reference metafile (Attachment B). The following script raises specific questions to assist in this visual inspection. In general, check that shape, size, line width, color (if used), and general text placement (i.e., somewhere in the box on restricted text, at the bottom of the cell on grid labels, etc.) agree between the resulting picture and the supplied illustration. Answer the script's questions. If you answer "No" to any of them, note why on the incident report sheets which follow this script.

The evaluation is numbered to correspond to the reference CGM illustration.

0)   **OVERALL**
_____   a)   Is the image divided into a grid with 20 boxes, 18 of which are the same size?
_____   b)   Are the grid lines black?

1)   **POLYLINE**
_____   a)   Does the shape match the shape of the included plot?
_____   b)   Is the line width larger than the width of the lines in the Disjoint Polyline element, but smaller than the width of the lines in the Elliptical Arc element?
_____   c)   Does the text string "(1) POLYLINE" appear near the bottom of the grid box?
_____   d)   If in color, are the lines red and the text black?

2)   **DISJOINT POLYLINE**
_____   a)   Does the shape match the shape of the included plot?
_____   b)   Does the line width match the width of the line in the Circular Arc 3 Point element?
_____   c)   Does the text string "(2) DISJOINT POLYLINE" appear near the bottom of the grid box?
_____   d)   If in color, are the lines green and the text black?

3)   **POLYMARKER**
_____   a)   Are the five POLYMARKERS, ".", "+", "*", "o", and "x" present and appearing in that order on a line running from the top left to the middle right of the grid? (Note: The illustration of reference metafile in Attachment B incorrectly shows a small square instead of a circle.)
_____   b)   Does the text string "(3) POLYMARKER" appear near the bottom of the grid?
_____   c)   Are the "." and "x" smaller than the "+" and " "? Are the "+" and " " smaller than the "*"?
_____   d)   If in color, is the "." black? Is the "+" red? Is the "*" green? Is the "o" blue? Is the "x" magenta?

4)   **TEXT**
_____   a)   Does the text string "LEFT" start near the upper right corner and print from right to left, so that it appears as "TFEL"? If using color, is the text cyan?
_____   b)   Does the text string "DOWN" start near the "L" in "TFEL", and print down, parallel to the right side of the grid box? If using color, is the text blue?
_____   c)   Is the text string ".ABCD" printed on the horizontal, roughly parallel with the N in "DOWN" ? If using color, is the text magenta?
_____   d)   Is the text string ".ABCD" printed on a roughly 45 degree angle with the "." almost aligned with the "." from the ".ABCD text string mentioned in the previous section? If in color, is the string orange?
_____   e)   Does the text string "(4) TEXT" appear near the bottom of the grid box? Is the string black?

5)

_____

_____

_____

_____

_____

_____

_____

RESTRICTED TEXT

a)   Is the text string "AbCdEfGhIjK" printed inside the separate boxes within the grid box?

b)   Is the box at the top of the grid box roughly square?

c)   Does the middle box start even with the others on the left hand side and extend to just past half of the grid box width?

d)   Does the last box start even with the others on the left hand side and extend to the right hand side of the grid box?

e)   Does the text string fit within the box? Descenders may hang below the box.

f)   Does the text string "(5) RESTRICTED TEXT" appear near the bottom of the grid box? Is this text black?

g)   If in color, are the text boxes black? Is the text blue?

6)

_____

_____

_____

_____

APPEND TEXT

a)   Does the text string ".ABC+D" appear near the middle of the grid box?

b)   Is the ".ABC" a smaller font than the "+D"? *(Note: the supplied plot does not correctly represent the relative size of the two test strings.)*

c)   Does the text string "(6) APPEND TEXT" appear near the bottom of the grid box?

d)   If in color, is the ".ABC" red? Is the "+D" in blue?

7)

_____

_____

_____

_____

POLYGON

a)   Does the large isosceles triangle match the shape of the triangle in the supplied plot?

b)   Does the edge width match the edge width for the grid?

c)   Does the text string "(7) POLYGON" appear near the bottom of the grid box?

d)   If in color, is the triangle outline blue? Is the fill pattern yellow? Is the text black?

8)

_____

_____

_____

_____

_____

_____

POLYGON SET

a)   Does the polygon shape match the shape in the supplied plot?

b)   Does the fill pattern consist of vertical equally-spaced parallel lines?

c)   Is the rightmost edge line invisible?

d)   Is the edge width narrower than the edge width for the grid?

e)   Does the text string "(8) POLYGON SET" appear near the bottom of the grid box?

f)   If in color, is the polygon edge black and is the fill pattern red? Is the text black?

9)

_____

_____

_____

CELL ARRAY

a)   Does the cell array pattern match the pattern in the supplied plot? If in color, check that all colors match the chart which appears after question c.

b)   Is the cell array skewed?

c)   Does the text string "(9) CELL ARRAY" appear near the bottom of the grid box? Is the text black?

Color

```
+-------------------------------------+
|  r  .  g  .  b  .  y  .  m  |
|  .  c  .  .  .  r  r  .  .  |
|  g  c  .  .  .  .  b  r  r  |
|  g  .  r  r  .  c  .  .  c  |
|  g  .  g  .  b  .  m  .  m  |
|  .  r  .  g  .  m  m  .  c  |
|  .  g  .  .  y  .  m  g  .  |
|  .  b  b  .  y  g  .  b  y  |
|  .  y  y  .  .  g  b  .  c  |
|  .  m  m  .  .  g  y  .  .  |
+-------------------------------------+
```

Key:

X	Black
.	White
b	blue
c	cyan
g	green
y	yellow
m	magenta
r	red

Black and White

```
+---------------------------------------+
|  X  .  X  .  X  .  X  .  X  |
|  .  X  .  .  .  X  X  .  .  |
|  X  X  .  .  .  .  X  X  X  |
|  X  .  X  X  .  X  .  .  X  |
|  X  .  X  .  X  .  X  .  X  |
|  .  X  .  X  .  X  X  .  X  |
|  .  X  .  .  X  .  X  X  .  |
|  .  X  X  .  X  X  .  X  X  |
|  .  X  X  .  .  X  X  .  X  |
|  .  X  X  .  .  X  X  .  .  |
+---------------------------------------+
```

10)   GENERALIZED DRAWING PRIMITIVE

This element is not allowed by MIL-D-28003 and is not included in the reference CGM.

11)   RECTANGLE
   a)   Does the rectangle shape match the shape in the supplied plot?
   b)   Is the edge width larger than the edge widths anywhere else in the plot?
   c)   Does the fill pattern consist of positive-slope equally-spaced parallel lines?
   d)   Are the fill pattern lines thinner than the rectangle edge lines?
   e)   Does the text string "(11) RECTANGLE" appear near the bottom of the grid box?
   f)   If in color, is the rectangle outline cyan? Is the text black? Is the fill pattern magenta?

12)   CIRCLE
   a)   Does the circle shape match the shape in the supplied plot?
   b)   Does the edge width match the width of the edges in the Elliptical Arc Close element?
   c)   Does the fill pattern consist of negative slope equally spaced parallel lines? *(Note: The fill pattern in the supplied plot is not correct.)*
   d)   Does the text string "(12) CIRCLE" appear near the bottom of the grid box?
   e)   If in color, is the circle outline green? Is the fill pattern blue? Is the text black?

13)   CIRCULAR ARC 3 POINT

_____ a) Does the circular arc shape match the shape in the supplied plot? Does the arc start and stop in the correct places?

_____ b) Does the line width match the width of the lines in the Disjoint Polyline element?

_____ c) Does the text string "(13) CIRCULAR ARC 3 POINT" appear near the bottom of the grid box?

_____ d) If in color, is the arc green? Is the text black?

14)   CIRCULAR ARC 3 POINT CLOSE

_____ a) Does the arc shape match the shape in the supplied plot? Is the arc closed with a chord closure?

_____ b) Does the edge width match the width of the edges in the Polygon element?

_____ c) Does the fill pattern consist of a horizontal and vertical crosshatch?

_____ d) Does the text string "(14) CIRCULAR ARC 3 POINT CLOSE" appear near the bottom of the grid box?

_____ e) If in color, is the arc outline orange? Is the fill pattern yellow? Is the text black?

15)   CIRCULAR ARC CENTRE

_____ a) Does the arc shape match the shape in the supplied plot?

_____ b) Is the edge width narrower than the width of the grid lines?

_____ c) Does the text string "(15) CIRCULAR ARC CENTRE" appear near the bottom of the grid box?

_____ d) If in color, is the arc outline green? Is the text black?

16)   CIRCULAR ARC CENTRE CLOSE

_____ a) Does the arc shape match the shape in the supplied plot?

_____ b) Is the closure a pie closure? Does the pie slice to the centre of the circle?

_____ c) Is the edge invisible?

_____ d) Does the fill pattern consist of positive-slope/negative-slope crosshatch?

_____ e) Does the text string "(16) CIRCULAR ARC CENTRE CLOSE" appear near the bottom of the grid box?

_____ f) If in color, is the fill pattern red? Is the text black?

17)   ELLIPSE

_____ a) Does the ellipse shape match the shape in the supplied plot?

_____ b) Is the ellipse slanted at roughly 45 degrees from the lower left to the upper right?

_____ c) Does the edge width match the width of the edges of the Circular Arc 3 Point Close element?

_____ d) Does the fill pattern consist of negative slope equally spaced parallel lines? *(Note: The fill pattern in the supplied plot is not correct.)*

_____ e) Does the text string "(17) ELLIPSE" appear near the bottom of the grid box?

_____ f) If in color, is the ellipse outline magenta? Is the fill pattern orange? Is the text black?

18)   ELLIPTICAL ARC

_____ a) Does the arc shape match the shape n the supplied plot?

_____ b) Does the line width match the larger than the lines in the Polyline element?

_____ c) Does the text string "(18) ELLIPTICAL ARC" appear near the bottom of the grid box?

_____ d) If in color, is the arc outline green? Is the text black?

19)
_____
_____
_____
_____

_____

ELLIPTICAL ARC CLOSE
a)   Does the circle shape match the shape in the supplied plot?
b)   Does the edge width match the width of the edges of the Circle element?
c)   Does the fill pattern consist of vertical equally spaced parallel lines?
d)   Does the text string "(19) ELLIPTICAL ARC CLOSE" appear near the bottom of the grid box?
e)   If in color, is the arc outline magenta? Is the fill pattern green? Is the text black?

20)
_____
_____
_____
_____
_____
_____
_____

LINE TYPE
a)   Are 5 distinct line types displayed?
b)   Is the first a solid line?
c)   Is the second a dashed line with long dashes?
d)   Is the third a dashed line with short dashes?
e)   Is the fourth a dashed line which alternates long and short dashes?
f)   Is the fifth a dashed line which alternates a long and 2 short dashes?
g)   If in color, are the lines red?

Incident Report

Incident Report

Incident Report

ATTACHMENT F   Clear Text Printout of the Graphical Primitive Elements Reference CGM

The following clear text listings were translated into binary to create MIL-D-28003 CGMs. The different element names used in each file (for example, LineType and line_type) represent different ways to specify the same element in a clear text file. The effect in the binary files is the same, so testers should not be confused by or concerned about the differences in syntax.

Listing for CTN-01i.clr

```
BegMF  "CTN-01id";                                      % 91-10-03 11:00 %
    MFVersion 1;
    MFDesc "CTN-01id, 91-10-03, MIL-D-28003/BASIC-1";
    MFElemList "DRAWINGPLUS";
    VDCType INTEGER;
    MaxColrIndex 255;
    IntegerPrec -32768, 32768;
    ColrPrec 255;
    ColrIndexPrec 255;
    FontList "HERSHEY:SIMPLEX_ROMAN" "HERSHEY:DUPLEX_ROMAN"
         "HERSHEY:COMPLEX_ROMAN";

BegPic "All Graphical Primitive Elements";
    ColrMode INDEXED;
    LineWidthMode SCALED;
    MarkerSizeMode SCALED;
    EdgeWidthMode SCALED;
    VDCExt 0,0,32767, 32767;
    BackColr 255 255 255;      % white %
```

% MODE	SUMMARY	---			%
%	COLOUR	LINE WIDTH	MARKER SIZE	EDGE WIDTH	%
% SCALING	SELECTION	SECIFICATION	SPECIFICATION	SPECIFICATION	%
% default	INDEXED	SCALED	SCALED	SCALED	%

```
BegPicBody;
    ColrTable    0                    %     index     color          %
                255   255   255        %      0       white          %
                  0     0     0        %      1       black          %
                255     0     0        %      2       red            %
                  0   255     0        %      3       green          %
                  0     0   255        %      4       blue           %
                255   255     0        %      5       yellow         %
                255     0   255        %      6       magenta        %
                  0   255   255        %      7       cyan           %
                255   255   255        %      8       white          %
                255   155     0;       %      9       orange         %
```

% Box Grid %
    EdgeVis ON;
    EdgeWidth 2.0;
    LineType 1;
    LineWidth 2.0;
    LineColr 1;
    % box and horizontal grid lines %
    % LINE Parameter Summary -- %
    % BUNDLE   LINE   LINE   LINE   %
    % INDEX   TYPE   WIDTH   COLOUR   %
    % default   set   set   set   %
    % 1   1   3.0   2 black   %
    % --- %
    Line (0,0) (0,32767) (32767,32767) (32767,0) (0,0);
    Line (0,22937) (32767,22937);
    Line (0,13107) (32767,13107);
    Line (0,3277) (32767,3277);

    % vertical grid lines %
    Line (5461,3277) (5461,32767);
    Line (10922,3277) (10922,32767);
    Line (16384,3277) (16384,32767);
    Line (21845,0) (21845,32767);
    Line (27306,3277) (27306,32767);

% Elements %

% Box 1 - POLYLINE %
    LineWidth 4.0;
    LineColr 2;
    % LINE Parameter Summary -- %
    % BUNDLE   LINE   LINE   LINE   %
    % INDEX   TYPE   WIDTH   COLOUR   %
    % default   set   set   set   %
    % 1   1   4.0   2 red   %
    % --- %
    Line   (655,26869) (4806,32112)   (4806,30801) (3386,32112)
            (2021,32112) (4806,29490)   (4806,28180) (655,32112)
            (655,30801) (4806,26869)   (3386,26869) (655,29490)
            (655,28180) (2021,26869);

% Box 2 - DISJOINT POLYLINE %
    LineWidth 3.0;
    LineColr 3;
    % LINE Parameter Summary -- %
    % BUNDLE   LINE   LINE   LINE   %
    % INDEX   TYPE   WIDTH   COLOUR   %
    % default   set   set   set   %
    % 1   1   3.0   3 green   %
    % --- %
    DisjtLine   (10267,26869) (6117,32112)   (6117,30801) (7482,32112)
            (8847,32112) (6117,29490)   (6117,28180) (10267,32112)
            (10267,30801) (6117,26869)   (7482,26869) (10267,29490)
            (10267,28180) (8847,26869);

% Box 3 - POLYMARKER %
    MarkerType 1;
    MarkerSize 1.0;
    MarkerColr 1;
    % MARKER PARAMETER SUMMARY -------------------------------------- %
    % BUNDLE   %
    % INDEX   TYPE   SIZE   COLOUR   %
    % default = 1   1   1.0   1 black   %
    % -- %
    Marker (11468,32112);

    MarkerType 2;
    MarkerSize 2.0;
    MarkerColr 2;
    % MARKER PARAMETER SUMMARY -------------------------------------- %
    % BUNDLE   %
    % INDEX   TYPE   SIZE   COLOUR   %
    % default = 1   2   2.0   2 red   %
    % -- %
    Marker (12451,30801);

    MarkerType 3;
    MarkerSize 3.0;
    MarkerColr 3;
    % MARKER PARAMETER SUMMARY -------------------------------------- %
    % BUNDLE   %
    % INDEX   TYPE   SIZE   COLOUR   %
    % default = 1   3   3.0   3 green   %
    % -- %
    Marker (13434,29490);

    MarkerType 4;
    MarkerSize 2.0;
    MarkerColr 4;
    % MARKER PARAMETER SUMMARY -------------------------------------- %
    % BUNDLE   %
    % INDEX   TYPE   SIZE   COLOUR   %
    % default = 1   4   2.0   4 blue   %
    % -- %
    Marker (14417,28180);

    MarkerType 5;
    MarkerSize 1.0;
    MarkerColr 6;
    % MARKER PARAMETER SUMMARY -------------------------------------- %
    % BUNDLE   %
    % INDEX   TYPE   SIZE   COLOUR   %
    % default = 1   5   1.0   6 magenta   %
    % -- %
    Marker (15400,26869);

% Box 4 - TEXT %
    TextFontIndex 1;
    TextColr 6;
    CharHeight 655;
    CharExpan 0.8;
    CharSpace 0.25;
    CharOri 0,1,1,0;

```
% TEXT  PARAMETER  SUMMARY -------------------------------------------------------  %
% BUNDLE    FONT      TEXT        EXPAN      CHAR.       TEXT           %
% INDEX     INDEX     PRECISION   FACTOR     SPACE       COLOUR         %
% default   set       default     set        set         set            %
% 1         1         1           0.8        0.25        6 magenta      %
%                                                                       %
% CHAR      CHAR.     TEXT        TEXT       CHAR SET   ALT CHAR        %
% HEIGHT    ORIENT    PATH        ALIGN      INDEX      SET INDEX       %
% set       set       default     default    default    default         %
% 655       0,1,1,0   right       normal     1          1               %
%  ---------------------------------------------------------------------  %
```

Text 17039,26869,final,".ABCD";

    TextColr 9;
    CharOri -1,1,1,1;

```
% TEXT  PARAMETER  SUMMARY -------------------------------------------------------  %
% BUNDLE    FONT      TEXT        EXPAN      CHAR.       TEXT           %
% INDEX     INDEX     PRECISION   FACTOR     SPACE       COLOUR         %
% default   set       default     set        set         set            %
% 1         1         1           0.8        0.25        9 orange       %
%                                                                       %
% CHAR      CHAR.     TEXT        TEXT       CHAR SET   ALT CHAR        %
% HEIGHT    ORIENT    PATH        ALIGN      INDEX      SET INDEX       %
% set       set       default     default    default    default         %
% 655       -1,1,1,1  right       normal     1          1               %
%  ---------------------------------------------------------------------  %
```

Text 17039,27852,final,".ABCD";

    TextColr 7;
    CharOri 0,1,1,0;
    TextPath LEFT;

```
% TEXT  PARAMETER  SUMMARY -------------------------------------------------------  %
% BUNDLE    FONT      TEXT        EXPAN      CHAR.       TEXT           %
% INDEX     INDEX     PRECISION   FACTOR     SPACE       COLOUR         %
% default   set       default     set        set         set            %
% 1         1         1           0.8        0.25        7 cyan         %
%                                                                       %
% CHAR      CHAR.     TEXT        TEXT       CHAR SET   ALT CHAR        %
% HEIGHT    ORIENT    PATH        ALIGN      INDEX      SET INDEX       %
% set       set       set         default    default    default         %
% 655       0,1,1,0   left        normal     1          1               %
%  ---------------------------------------------------------------------  %
```

Text 20971,31456,final,"LEFT";

TextColr 4;
TextPath DOWN;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	default	set	set	set	%
% 1	1	1	0.8	0.25	4 blue	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 655	0,1,1,0	down	normal	1	1	%
%						%

Text 20971,31456,final,"DOWN";

% Box 5 - RESTRICTED TEXT %

LineType 1;
IntStyle EMPTY;
TextColr 4;
CharHeight 655;
TextPath RIGHT;

% CLOSED FIGURE PARAMETER SUMMARY							%
% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% EMPTY	set	default	default	INDEX	default	default	%
%	4 blue	1 =	1	def = 1	1		%
%							%
% EDGE	EDGE	FILL REF					%
% COLOUR	VISIBIL.	POINT					%
%	set	default					%
%	on	ll corn					%
%							%

Rect 22282,26869,26869,27524;
Rect 22282,28180,25558,29490;
Rect 22282,30146,24248,32112;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	default	set	set	set	%
% 1	1	1	0.8	0.25	4 blue	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 655	0,1,1,0	right	normal	1	1	%
%						%

RestrText 4587,1311,22282,26869,final,"AbCdEfGhIjK";
RestrText 3277,1638,22282,28180,final,"AbCdEfGhIjK";
RestrText 1966,1966,22282,30146,final,"AbCdEfGhIjK";

% Box 6 - APPEND TEXT %
    TextFontIndex 2;
    TextColr 2;
    CharHeight 666;
    CharExpan 0.8;
    CharSpace 0.10;
    CharOri 0,1,1,0;

% TEXT PARAMETER SUMMARY -- %

% BUNDLE INDEX	FONT INDEX	TEXT PRECISION	EXPAN FACTOR	CHAR. SPACE	TEXT COLOUR	%
% default	set	default	set	set	set	%
% 1	2	1	0.8	0.10	2 red	%
%						%
% CHAR HEIGHT	CHAR. ORIENT	TEXT PATH	TEXT ALIGN	CHAR SET INDEX	ALT CHAR SET INDEX	%
% set	set	default	default	default	default	%
% 666	0,1,1,0	right	normal	1	1	%
% ---						%

Text 27961,27852,notfinal,".ABC";

    TextFontIndex 3;
    TextColr 4;
    CharHeight 1000;

% TEXT PARAMETER SUMMARY -- %

% BUNDLE INDEX	FONT INDEX	TEXT PRECISION	EXPAN FACTOR	CHAR. SPACE	TEXT COLOUR	%
% default	set	default	set	set	set	%
% 1	3	1	0.8	0.10	4 blue	%
%						%
% CHAR HEIGHT	CHAR. ORIENT	TEXT PATH	TEXT ALIGN	CHAR SET INDEX	ALT CHAR SET INDEX	%
% set	set	set	default	default	default	%
% 1000	0,1,1,0	right	normal	1	1	%
% ---						%

ApndText final,"+D";

% Box 7 - POLYGON %
    EdgeWidth 2.0;
    EdgeColr 4;
    IntStyle SOLID;
    HatchIndex 1;
    FillColr 5;

% CLOSED FIGURE PARAMETER SUMMARY -- %

% INTERIOR STYLE	FILL COLOUR	HATCH INDEX	PATTERN INDEX	EDGE BUNDLE INDEX	EDGE TYPE	EDGE WIDTH	%
% set	set	set	default		default	set	%
% SOLID	5 yellow	1 =	1	def = 1	1	2.0	%
%							%
% EDGE COLOUR	EDGE VISIBIL.	FILL REF POINT	CHAR SET INDEX	ALT CHR SET NDX			%
% set	set	default	default	default			%
% 4 blue	on	ll corn	1	1			%
% ---							%

Polygon (655,17039) (2731,22282) (4587,17039);

% Box 8 - POLYGON SET %
    IntStyle HATCH;
    FillColr 2;
    HatchIndex 2;
    EdgeWidth 1.0;
    EdgeColr 1;
    % CLOSED FIGURE PARAMETER SUMMARY --- %

% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	set	default	INDEX	default	set	%
% HATCH	2 red	2 |||	1	def = 1	1	1.0	%
%							%
% EDGE	EDGE	FILL REF	CHAR SET	ALT CHR			%
% COLOUR	VISIBIL.	POINT	INDEX	SET NDX			%
% set	set	default	default	default			%
% 4 blue	on	ll corn	1	1			%
% ---							%

    PolygonSet (6117,17039),vis,(7536,21626,vis, (9502,22282),invis, (10485,17039),closevis,
        (7373,18350),vis, (6117,22282),vis, (9502,18022),closevis;

% Box 9 - CELL ARRAY %
    CellArray

%	P		Q		R	nx	ny	CI		%
	(12468,22282)		(14500,17039)		(15728,22282)	9	10	65535		
	2	0	3	0	4	0	5	0	6	%101010101%
	0	7	8	0	0	2	2	0	0	%011001100%
	3	7	8	0	0	0	4	2	2	%111000111%
	3	0	2	2	0	7	0	0	7	%101101001%
	3	0	3	0	4	0	6	0	6	%101010101%
	0	2	0	3	0	6	6	0	7	%010101101%
	0	3	0	0	5	0	6	3	0	%010010110%
	0	4	4	0	5	3	0	4	5	%011011011%
	0	5	5	0	0	3	4	0	7	%011001101%
	0	6	6	0	0	3	5	0	0;	%011001100%

% Box 10 not used; GDP not in MIL-D-28003 %

% Box 11 - RECTANGLE %
    FillColr 6;
    HatchIndex 3;
    EdgeWidth 10.0;
    EdgeColr 7;
    % CLOSED FIGURE PARAMETER SUMMARY ---------------------------------- %

% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	set	default	INDEX	default	set	%
% HATCH	6 magenta	3 ///	def = 1	1	1	10.0	%
%							%
% EDGE	EDGE	FILL REF	CHAR SET	ALT CHR			%
% COLOUR	VISIBIL.	POINT	INDEX	SET NDX			%
% set	set	default	default	default			%
% 7 cyan	on	ll corn	1	1			%
% ---							%

    Rect (17039,17039) (21189,22282);

% Box 12 - CIRCLE %
    FillColr 4;
    HatchIndex 4;
    EdgeWidth 4.0;
    EdgeColr 3;

% CLOSED FIGURE PARAMETER SUMMARY -- %

% INTERIOR STYLE	FILL COLOUR	HATCH INDEX	PATTERN INDEX	EDGE BUNDLE INDEX	EDGE TYPE	EDGE WIDTH	%
% set	set	set	default		default	set	%
% HATCH	4 blue	4 \\\	1	def = 1	1	4.0	%
%							%
% EDGE COLOUR	EDGE VISIBIL.	FILL REF POINT	CHAR SET INDEX	ALT CHR SET NDX			%
% set	set	default	default	default			%
% 3 green	on	ll corn	1	1			%
% --							%

    Circle (24575,19660),2458;

% Box 13 - CIRCULAR ARC 3 POINT %
    LineType 1;

% LINE Parameter Summary -- %

% BUNDLE INDEX	LINE TYPE	LINE WIDTH	LINE COLOUR	%
% default	set	set	set	%
% 1	1	3.0	3 green	%
% --				%

    Arc3Pt (32112,21299) (28398,17694) (31129,17039);

% Box 14 - CIRCULAR ARC 3 POINT CLOSE (CHORD) %
    FillColr 5;
    HatchIndex 5;
    EdgeWidth 2.0;
    EdgeColr 9;

% CLOSED FIGURE PARAMETER SUMMARY -- %

% INTERIOR STYLE	FILL COLOUR	HATCH INDEX	PATTERN INDEX	EDGE BUNDLE INDEX	EDGE TYPE	EDGE WIDTH	%
% set	set	set	default		default	set	%
% HATCH	5 yellow	4 ###	1	def = 1	1	2.0	%
%							%
% EDGE COLOUR	EDGE VISIBIL.	FILL REF POINT	CHAR SET INDEX	ALT CHR SET NDX			%
% set	set	default	default	default			%
% 9 orange	on	ll corn	1	1			%
% --							%

    Arc3PtClose (4915,11796) (1092,7864) (3823,6553),chord;

% BOX 15 - CIRCULAR ARC CENTRE %
    LineWidth 1.0;
    LineType 1;
    % LINE Parameter Summary --- %
    % BUNDLE   LINE   LINE   LINE   %
    % INDEX   TYPE   WIDTH   COLOUR   %
    % default   set   set   set   %
    % 1   1   1.0   3 green   %
    % -- %
    %   x   y   DXs   DYs   DXe   DYe   rad   %
    ArcCtr   8192, 9830,   5898,   10485, 9175,   8192,   2458;

% Box 16 - CIRCULAR ARC CENTRE CLOSE (PIE) %
    HatchIndex 6;
    FillColr 2;
    EdgeColr 4;
    EdgeVis OFF;
    % CLOSED FIGURE PARAMETER SUMMARY ---------------------------------- %

% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	set	default	INDEX	default	set	%
% HATCH	2 red	6 xxx	1	def = 1	1	2.0	%
%							%
% EDGE	EDGE	FILL REF	CHAR SET	ALT CHR			%
% COLOUR	VISIBIL.	POINT	INDEX	SET NDX			%
% set	set	default	default	default			%
% 4 blue	off	ll corn	1	1			%

    % -- %
    %   x   y   DXs   DYs   DXe   DYe   rad type %
    ArcCtrClose   13631, 9830,   5898,   10485, 15728, 8192,   2458,   pie;

% Box 17 - ELLIPSE %
    FillColr 9;
    HatchIndex 4;
    EdgeColr 6;
    EdgeVis ON;
    % CLOSED FIGURE PARAMETER SUMMARY ---------------------------------- %

% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	set	default	INDEX	default	set	%
% HATCH	9 orange	4 \\\	1	def = 1	1	2.0	%
%							%
% EDGE	EDGE	FILL REF	CHAR SET	ALT CHR			%
% COLOUR	VISIBIL.	POINT	INDEX	SET NDX			%
% set	set	default	default	default			%
% 6 magenta	on	ll corn	1	1			%

    % -- %
Ellipse (19114,9830) 16973,7864,18022,10485;

% Box 18 - ELLIPTICAL ARC %
     LineWidth 6.0;
     LineType 1;
     % LINE Parameter Summary --- %
     % BUNDLE   LINE   LINE   LINE   %
     % INDEX   TYPE   WIDTH   COLOUR   %
     % default   set   set   set   %
     % 1   1   6.0   3 green   %
     % -- %
     EllipArc (22282,9175)   % centre point   %
               (19158,6226)   % 1st CDP endpoint   %
               (19551,10158)   % 2nd CDP endpoint   %
               (1311,3604)   % DX_start,DY_start   %
               (3277,-2949);   % DX_end,DY_end   %

% Box 19 - ELLIPTICAL ARC CLOSE (PIE) %
     FillColr 3;
     HatchIndex 2;
     EdgeWidth 4.0;
     % CLOSED FIGURE PARAMETER SUMMARY --- %

% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	set	default	INDEX	default	set	%
% HATCH	3 green	2 | | |	1	def = 1	1	4.0	%
%							%
% EDGE	EDGE	FILL REF	CHAR SET	ALT CHR			%
% COLOUR	VISIBIL.	POINT	INDEX	SET NDX			%
% set	set	default	default	default			%
% 6 magenta	on	ll corn	1	1			%

     % -- %
     EllipArcClose (27852,9175)   % centre point   %
                    (24575,6226)   % 1st CDP endpoint   %
                    (24903,10158)   % 2nd CDP endpoint   %
                    (1311,3932)   % DX_start,DY_start   %
                    (3277,-2621)   % DX_end,DY_end   %
                    pie;

% Box "20" - LINE TYPE %
     LineColr 2;
     LineWidth 2.0;
     LineType 5;
     % LINE Parameter Summary --- %
     % BUNDLE   LINE   LINE   LINE   %
     % INDEX   TYPE   WIDTH   COLOUR   %
     % default   set   set   set   %
     % 1   5 dash-dot-dot   2.0   2 red   %
     % -- %
     Line (1638,655) (19660,655);

LineType 4;
```
% LINE Parameter Summary ---------------------------------------------- %
% BUNDLE     LINE             LINE        LINE                           %
% INDEX      TYPE             WIDTH       COLOUR                         %
% default    set              set         set                            %
% 1          4 dash-dot       2.0         2 red                          %
% ---------------------------------------------------------------------- %
```
Line (1638,983),(19660,983);

LineType 3;
```
% LINE Parameter Summary ---------------------------------------------- %
% BUNDLE     LINE             LINE        LINE                           %
% INDEX      TYPE             WIDTH       COLOUR                         %
% default    set              set         set                            %
% 1          3 dot            2.0         2 red                          %
% ---------------------------------------------------------------------- %
```
Line (1638,1311) (19660,1311);

LineType 2;
```
% LINE Parameter Summary ---------------------------------------------- %
% BUNDLE     LINE             LINE        LINE                           %
% INDEX      TYPE             WIDTH       COLOUR                         %
% default    set              set         set                            %
% 1          2 dash           2.0         2 red                          %
% ---------------------------------------------------------------------- %
```
Line (1638,1638) (19660,1638);

LineType 1;
```
% LINE Parameter Summary ---------------------------------------------- %
% BUNDLE     LINE             LINE        LINE                           %
% INDEX      TYPE             WIDTH       COLOUR                         %
% default    set              set         set                            %
% 1          1 solid          2.0         2 red                          %
% ---------------------------------------------------------------------- %
```
Line (1638,1966) (19660,1966);

% Labels in Boxes %
```
    TextFontIndex 3;
    TextPrec STROKE;
    CharExpan 0.8;
    CharSpace 0.01;
    TextColr 1;
    CharHeight 450;
    CharOri 0,1,1,0;
    TextPath RIGHT;
% TEXT  PARAMETER  SUMMARY -------------------------------------------------------------- %
% BUNDLE    FONT       TEXT        EXPAN      CHAR.      TEXT                               %
% INDEX     INDEX      PRECISION   FACTOR     SPACE      COLOUR                             %
% default   set        set         set        set        set                               %
% 1         3          STROKE      0.8        0.01       1 black                            %
%                                                                                          %
% CHAR      CHAR.      TEXT        TEXT       CHAR SET   ALT CHAR                           %
% HEIGHT    ORIENT     PATH        ALIGN      INDEX      SET INDEX                          %
% set       set        set         default    default    default                           %
% 450       0,1,1,0    right       normal     1          1                                 %
% -------------------------------------------------------------------------------------- %
```

```
Text     164,24575,      final,      "(1) POLYLINE";
Text     5625,24575,     final,      "(2) DISJOINT";
Text     5625,23920,     final,      " POLYLINE";
Text     11086,24575,    final,      "(3) POLYMARKER";
Text     16547,24575,    final,      "(4) TEXT";
Text     22008,24575,    final,      "(5) RESTRICTED";
Text     22008,23920,    final,      " TEXT";
Text     27470,24575,    final,      "(6) APPEND";
Text     27470,23920,    final,      " TEXT";
Text     164,14745,      final,      "(7) POLYGON";
Text     5625,14745,     final,      "(8) POLYGON";
Text     5625,14090,     final,      " SET";
Text     11086,14745,    final,      "(9) CELL";
Text     11086,14090,    final      ," ARRAY";
```
% Not Included - - - - (10) GENERALIZED DRAWING PRIMATIVE (GDP) - %
```
Text     16547,14745,    final,      "(11) RECTANGLE";
Text     22008,14745,    final,      "(12) CIRCLE";
Text     27470,14745,    final,      "(13) CIRCULAR";
Text     27470,14090,    final,      " ARC 3 POINT";
Text     164,4915,       final,      "(14) CIRCULAR";
Text     164,4260,       final,      " ARC 3 POINT";
Text     164,3604,       final,      " CLOSE";
Text     5625,4915,      final,      "(15) CIRCULAR";
Text     5625,4260,      final,      " ARC CENTRE";
Text     11086,4915,     final,      "(16) CIRCULAR";
Text     11086,4260,     final,      " ARC CENTRE";
Text     11086,3604,     final,      " CLOSE";
Text     16547,4915,     final,      "(17) ELLIPSE";
Text     22008,4915,     final,      "(18) ELLIPTICAL";
Text     22008,4260,     final,      " ARC";
Text     27470,4915,     final,      "(19) ELLIPTICAL";
Text     27470,4260,     final,      " ARC CLOSE";
Text     1638,2359,      final,      "LINE  TYPE";
```

CharHeight 200;

% TEXT PARAMETER SUMMARY -- %

% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	set	set	set	set	%
% 1	3	STROKE	0.8	0.01	1 black	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 200	0,1,1,0	right	normal	1	1	%

% -- %
```
Text 750,1966,final,"1.";
Text 750,1638,final,"2.";
Text 750,1311,final,"3.";
Text 750,983,final,"4.";
Text 750,655,final,"5.";
```

% Figure Label %
 CharHeight 450;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	set	set	set	set	%
% 1	3	STROKE	0.8	0.01	1 black	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 450	0,1,1,0	right	normal	1	1	%
%						%

 Text 22063,2621,final,"CALS TEST NETWORK";
 Text 22063,1868,final,"MIL-D-28003";
 Text 22063,1114,final,"Computer Graphics Metafile";
 Text 22063,360,final,"File: CTN-01Id, Draft 91-10-03";

EndPIC;
EndMF;

Listing for CTN-01r.clr

BEGMF "CTN-01rd";   % 91-10-03 11:00 %
    MFVersion 1;
    MFDesc "CTN-01rd, 91-10-03, MIL-D-28003/BASIC-1";
    MFElemList "DRAWINGPLUS";
    VDCType REAL; % more usual: INTEGER %
    MaxColrIndex 255;
    RealPrec -32767.,32767.,6;
    ColrPrec 255;
    ColrIndexPrec 255;
    Fontlist "HERSHEY:SIMPLEX_ROMAN","HERSHEY:DUPLEX_ROMAN",
        "HERSHEY:COMPLEX_ROMAN";

BegPic "All Graphical Primitive Elements";
    ColrMode INDEXED;
    LineWidthMode SCALED;
    MarkerSizeMode SCALED;
    EdgeWidthMode SCALED;
    VDCExt (0.0,0.0),(1.0,1.0);
    BackColr 255 255 255; % white %

% MODE	SUMMARY	------	------	------	%
%	COLOUR	LINE WIDTH	MARKER SIZE	EDGE WIDTH	%
% SCALING	SELECTION	SECIFICATION	SPECIFICATION	SPECIFICATION	%
% default	INDEXED	SCALED	SCALED	SCALED	%

BegPicBody;
    ColrTable
            0   %   index   color   %
            255   255   255   %   0   white   %
            0   0   0   %   1   black   %
            255   0   0   %   2   red   %
            0   255   0   %   3   green   %
            0   0   255   %   4   blue   %
            255   255   0   %   5   yellow   %
            255   0   255   %   6   magenta   %
            0   255   255   %   7   cyan   %
            255   255   255   %   8   white   %
            255   155   0;   %   9   orange   %

% Box grid %
    EdgeVis ON;
    EdgeWidth 2.0;
    LineType 1;
    LineWidth 2.0;
    LineColr 1;

% Box and horizontal grid lines %
% LINE Parameter Summary ------------------------------------- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	1	3.0	1 black	%
% ---				%

```
Line  (0.0,0.0),(0.0,1.0),(1.0,1.0),(1.0,0.0),(0.0,0.0);
Line (0.0,0.7000000),(1.0,0.7000000);
Line (0.0,0.4000000),(1.0,0.4000000);
Line (0.0,0.1000000),(1.0,0.1000000);

% Vertical grid lines %
Line    (  .1666666,0.1),(0.1666666,1.0);
Line    (  .3333333,0.1),(0.3333333,1.0);
Line    (  .5000000,0.1),(0.5000000,1.0);
Line    (  .6666666,0.0),(0.6666666,1.0);
Line    (  .8333333,0.1),(0.8333333,1.0);
```

% Elements %

% Box 1 - POLYLINE %

```
    LineWidth 4.0;
    LineColr 2;
```

% LINE Parameter Summary --- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	1	4.0	2 red	%

% --- %

```
    Line (0.0200000,0.82),(0.1466666,0.98),(0.1466666,0.94),
        (0.1033333,0.98),(0.0616666,0.98),(0.1466666,0.90),
        (0.1466666,0.86),(0.0200000,0.98),(0.0200000,0.94),
        (0.1466666,0.82),(0.1033333,0.82),(0.0200000,0.90),
        (0.0200000,0.86),(0.0616666,0.82);
```

% Box 2 - DISJOINT POLYLINE %

```
    LineWidth  3.0;
    LineColr 3;
```

% LINE Parameter Summary --- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	1	3.0	3 green	%

% --- %

```
    DisjtLine (0.3133333,0.82),(0.1866666,0.98),(0.1866666,0.94),(0.2283333,0.98),
        (0.2700000,0.98),(0.1866666,0.90),(0.1866666,0.86),(0.3133333,0.98),
        (0.3133333,0.94),(0.1866666,0.82),(0.2283333,0.82),(0.3133333,0.90),
        (0.3133333,0.86),(0.2700000,0.82);
```

% Box 3 - POLYMARKER %

```
    MarkerType  1;
    MarkerSize 1.0;
    MarkerColr 1;
```

% MARKER PARAMETER SUMMARY ------------------------------------- %

% BUNDLE				%
% INDEX	TYPE	SIZE	COLOUR	%
% default = 1	1	1.0	1 black	%

% --- %

```
    Marker (0.35,0.980);
```

```
MarkerType 2;
MarkerSize 2.0;
MarkerColr 2;
% MARKER PARAMETER SUMMARY ------------------------------------   %
% BUNDLE                                                           %
% INDEX        TYPE      SIZE      COLOUR                          %
% default = 1   2        2.0       2 red                           %
% -------------------------------------------------------------    %
Marker (0.38,0.940);


MarkerType 3;
MarkerSize 3.0;
MarkerColr 3;
% MARKER PARAMETER SUMMARY ------------------------------------   %
% BUNDLE                                                           %
% INDEX        TYPE      SIZE      COLOUR                          %
% default = 1   3        3.0       3 green                         %
% -------------------------------------------------------------    %
Marker (0.41,0.900);


MarkerType 4;
MarkerSize 2.0;
MarkerColr 4;
% MARKER PARAMETER SUMMARY ------------------------------------   %
% BUNDLE                                                           %
% INDEX        TYPE      SIZE      COLOUR                          %
% default = 1   4        2.0       4 blue                          %
% -------------------------------------------------------------    %
 Marker (0.44,0.860);


MarkerType 5;
MarkerSize 1.0;
MarkerColr 6;
% MARKER PARAMETER SUMMARY ------------------------------------   %
% BUNDLE                                                           %
% INDEX        TYPE      SIZE      COLOUR                          %
% default = 1   5        1.0       6 magenta                       %
% -------------------------------------------------------------    %
Marker (0.47,0.820);

% Box  4 - TEXT %
    TextFontIndex 1;
    TextColr 6;
    CharHeight 0.02;
    CharExpan 0.8;
    CharSpace 0.10;
    CharOri 0.0,1.0,1.0,0.0;
```

```
% TEXT  PARAMETER  SUMMARY --------------------------------------------------------  %
% BUNDLE    FONT      TEXT        EXPAN      CHAR.       TEXT             %
% INDEX     INDEX     PRECISION   FACTOR     SPACE       COLOUR           %
% default   set       default     set        set         set             %
% 1         1         1           0.8        0.10        6 magenta        %
%                                                                         %
% CHAR      CHAR.     TEXT        TEXT       CHAR SET    ALT CHAR         %
% HEIGHT    ORIENT    PATH        ALIGN      INDEX       SET INDEX        %
% set       set       default     default    default     default         %
% 0.02      0,1,1,0   right       normal     1           1               %
% ----------------------------------------------------------------------  %
```
Text 0.5200000,0.8200000,final,".ABCD";

TextColr 9;
CharOri -1.0,1.0,1.0,1.0; %
```
% TEXT  PARAMETER  SUMMARY --------------------------------------------------------  %
% BUNDLE    FONT      TEXT        EXPAN      CHAR.       TEXT             %
% INDEX     INDEX     PRECISION   FACTOR     SPACE       COLOUR           %
% default   set       default     set        set         set             %
% 1         1         1           0.8        0.10        9 orange         %
%                                                                         %
% CHAR      CHAR.     TEXT        TEXT       CHAR SET    ALT CHAR         %
% HEIGHT    ORIENT    PATH        ALIGN      INDEX       SET INDEX        %
% set       set       default     default    default     default         %
% 0.02      -1,1,1,1  right       normal     1           1               %
% ----------------------------------------------------------------------  %
```
Text 0.5200000,0.8500000,final,".ABCD";

TextColr 7;
CharOri 0.0,1.0,1.0,0.0;
TextPath LEFT;
```
% TEXT  PARAMETER  SUMMARY --------------------------------------------------------  %
% BUNDLE    FONT      TEXT        EXPAN      CHAR.       TEXT             %
% INDEX     INDEX     PRECISION   FACTOR     SPACE       COLOUR           %
% default   set       default     set        set         set             %
% 1         1         1           0.8        0.10        7 cyan           %
%                                                                         %
% CHAR      CHAR.     TEXT        TEXT       CHAR SET    ALT CHAR         %
% HEIGHT    ORIENT    PATH        ALIGN      INDEX       SET INDEX        %
% set       set       set         default    default     default         %
% 0.02      0,1,1,0   left        normal     1           1               %
% ----------------------------------------------------------------------  %
```
Text 0.6400000,0.9600000,final,"LEFT";

TextColr 4;
TextPath DOWN;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	default	set	set	set	%
% 1	1	1	0.8	0.10	4 blue	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 0.02	0,1,1,0	down	normal	1	1	%
% --------						%

Text 0.6400000,0.9600000,final,"DOWN";

% Box 5 - RESTRICTED TEXT %

LineType 1;
IntStyle EMPTY;
TextColr 4;
CharHeight 0.020;
TextPath RIGHT;

% CLOSED FIGURE PARAMETER SUMMARY							%
% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	default	default	INDEX	default	set	%
% EMPTY	4 blue	1 =	1	def = 1	1	2.0	%
%							%
% EDGE	EDGE	FILL REF					%
% COLOUR	VISIBIL.	POINT					%
% default	set	default					%
% 1 black	on	ll corn					%
% --------							%

Rect 0.68,0.82,0.82,0.84;
Rect 0.68,0.86,0.78,0.90;
Rect 0.68,0.92,0.74,0.98;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	default	set	set	set	%
% 1	1	STROKE	0.8	0.10	4 blue	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 0.02	0,1,1,0	right	normal	1	1	%
% --------						%

RestrText 0.14,0.04,0.68,0.82,final,"AbCdEfGhIjK";
RestrText 0.10,0.05,0.68,0.86,final,"AbCdEfGhIjK";
RestrText 0.06,0.06,0.68,0.92,final,"AbCdEfGhIjK";

% Box 6 - APPEND TEXT %
    TextFontIndex 2;
    TextColr 2;
    CharHeight 0.02;
    CharExpan 0.8;
    CharSpace 0.10;
    CharOri 0.0,1.0,1.0,0.0;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	default	set	set	set	%
% 1	2	1	0.8	0.10	2 red	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 0.02	0,1,1,0	right	normal	1	1	%
%						%

Text 0.8533333,0.8500000,notfinal,".ABC";

    TextFontIndex 3;
    TextColr 4;
    CharHeight 0.03;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	default	set	set	set	%
% 1	3	1	0.8	0.10	4 blue	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 0.03	0,1,1,0	right	normal	1	1	%
%						%

ApndText final,"+D";

% Box 7 - POLYGON %
    EdgeWidth 2.0;
    EdgeColr 4;
    IntStyle SOLID;
    HatchIndex 1;
    FillColr 5;

% CLOSED FIGURE PARAMETER SUMMARY							%
% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	set	default	INDEX	default	set	%
% SOLID	5 yellow	1 = 1	1	def = 1	1	2.0	%
%							%
% EDGE	EDGE	FILL REF	CHAR SET	ALT CHR			%
% COLOUR	VISIBIL.	POINT	INDEX	SET NDX			%
% set	set	default	default	default			%
% 4 blue	on	ll corn	1	1			%
%							%

Polygon 0.02,0.52,0.0833333,0.68,0.14,0.52;

% Box 8 - POLYGON SET %
    IntStyle HATCH;
    FillColr 2;
    HatchIndex 2;
    EdgeWidth 1.0;
    EdgeColr 1;

% CLOSED FIGURE PARAMETER SUMMARY --- %

% INTERIOR	FILL	HATCH	PATTERN	EDGE	EDGE	EDGE	%
% STYLE	COLOUR	INDEX	INDEX	BUNDLE	TYPE	WIDTH	%
% set	set	set	default	INDEX	default	set	%
% HATCH	2 red	2 |||	1	def = 1	1	1.0	%
%							%
% EDGE	EDGE	FILL REF	CHAR SET	ALT CHR			%
% COLOUR	VISIBIL.	POINT	INDEX	SET NDX			%
% set	set	default	default	default			%
% 1 black	on	ll corn	1	1			%

% --- %

    PolygonSet 0.1866666,0.52,vis,
          0.23,0.66,vis,
          0.29,0.68,invis,
          0.32,0.52,closevis,
          0.225,0.56,vis,
          0.1866666,0.68,vis,
          0.29,0.55,closevis;

% Box 9 - CELL ARRAY %
    CellArray

% P		Q		R		nx	ny	CI	%		
(.38,.68)		(.44,.52)		(.48,.68)		9	10	65535			
2	0	3	0	4	0	5	0	6	%	101010101	%
0	7	8	0	0	2	2	0	0	%	011001100	%
3	7	8	0	0	0	4	2	2	%	111000111	%
3	0	2	2	0	7	0	0	7	%	101101001	%
3	0	3	0	4	0	6	0	6	%	101010101	%
0	2	0	3	0	6	6	0	7	%	010101101	%
0	3	0	0	5	0	6	3	0	%	010010110	%
0	4	4	0	5	3	0	4	5	%	011011011	%
0	5	5	0	0	3	4	0	7	%	011001101	%
0	6	6	0	0	3	5	0	0;	%	011001100	%

% Box 10 not used; GDP not in MIL-D-28003 %

%Box 11 - RECTANGLE %
    FillColr 6;
    HatchIndex 3;
    EdgeWidth 10.0;
    EdgeColr 7;

```
% CLOSED FIGURE PARAMETER SUMMARY --------------------------------------------- %
% INTERIOR    FILL       HATCH      PATTERN     EDGE       EDGE      EDGE        %
% STYLE       COLOUR     INDEX      INDEX       BUNDLE     TYPE      WIDTH       %
% set         set        set        default     INDEX      default   set         %
% HATCH       6 magenta    3 ///    1           def = 1    1         10.0        %
%                                                                                %
% EDGE        EDGE       FILL REF   CHAR SET    ALT CHR                          %
% COLOUR      VISIBIL.   POINT      INDEX       SET NDX                          %
% set         set        default    default     default                         %
% 7 cyan      on         ll corn    1           1                                %
% ---------------------------------------------------------------------------- %
```
Rect (0.5200000,0.5200000),(0.6466666,0.6800000);

% Box 12 - CIRCLE %
    FillColr 4;
    HatchIndex 4;
    EdgeWidth 4.0;
    EdgeColr 3;
```
% CLOSED FIGURE PARAMETER SUMMARY --------------------------------------------- %
% INTERIOR    FILL       HATCH      PATTERN     EDGE       EDGE      EDGE        %
% STYLE       COLOUR     INDEX      INDEX       BUNDLE     TYPE      WIDTH       %
% set         set        set        default     INDEX      default   set         %
% HATCH       4 blue     4 \\\      1           def = 1    1         4.0         %
%                                                                                %
% EDGE        EDGE       FILL REF   CHAR SET    ALT CHR                          %
% COLOUR      VISIBIL.   POINT      INDEX       SET NDX                          %
% set         set        default    default     default                         %
% 3 green     on         ll corn    1           1                                %
% ---------------------------------------------------------------------------- %
```
Circle (0.7500000,0.6000000),0.075;

% Box 13 - CIRCULAR ARC 3 POINT %
    LineType 1;
```
% LINE Parameter Summary -------------------------------------------- %
% BUNDLE      LINE       LINE        LINE                              %
% INDEX       TYPE       WIDTH       COLOUR                            %
% default     set        set         set                              %
% 1           1          3.0         3 green                          %
% --------------------------------------------------------------------- %
```
Arc3Pt (0.9800000,0.6500000) (0.8666666,0.5400000) (0.9500000,0.5200000);

% Box 14 - CIRCULAR ARC 3 POINT CLOSE (CHORD) %
    FillColr 5;
    HatchIndex 5;
    EdgeWidth 2.0;
    EdgeColr 9;

```
% CLOSED FIGURE PARAMETER SUMMARY ----------------------------------------  %
% INTERIOR   FILL     HATCH    PATTERN    EDGE      EDGE      EDGE            %
% STYLE      COLOUR   INDEX    INDEX      BUNDLE    TYPE      WIDTH           %
% set        set      set      default    INDEX     default   set            %
% HATCH      5 yellow 5  ###   1          def = 1   1         2.0            %
%                                                                            %
% EDGE       EDGE     FILL REF CHAR SET   ALT CHR                            %
% COLOUR     VISIBIL. POINT    INDEX      SET NDX                            %
% set        set      default  default    default                           %
% 9 orange   on       ll corn  1          1                                  %
%  --------------------------------------------------------------------      %
Arc3PtClose (0.1500000,0.3600000) (0.0333333,0.2400000) (0.1166666,0.2000000),chord;
```

% Box 15 - CIRCULAR ARC CENTRE %
    LineWidth 1.0;
    LineType 1;

```
% LINE Parameter Summary ----------------------------------------   %
% BUNDLE     LINE       LINE        LINE                             %
% INDEX      TYPE       WIDTH       COLOUR                           %
% default    set        set         set                             %
% 1          1          1.0         3 green                         %
%  ------------------------------------------------------------      %
%           x    y    DXs  DYs DXe  DYe rad  %
ArcCtr ( 0.25, 0.3), 0.18, 0.32, 0.28, 0.25, 0.075;
```

% Box 16 - CIRCULAR ARC CENTRE CLOSE (PIE) %
    HatchIndex 6;
    FillColr 2;
    EdgeColr 4;
    EdgeVis OFF;

```
% CLOSED FIGURE PARAMETER SUMMARY ----------------------------------------  %
% INTERIOR   FILL     HATCH    PATTERN    EDGE      EDGE      EDGE            %
% STYLE      COLOUR   INDEX    INDEX      BUNDLE    TYPE      WIDTH           %
% set        set      set      default    INDEX     default   set            %
% HATCH      2 red    6 xxx    1          def = 1   1         2.0            %
%                                                                            %
% EDGE       EDGE     FILL REF CHAR SET   ALT CHR                            %
% COLOUR     VISIBIL. POINT    INDEX      SET NDX                            %
% set        set      default  default    default                           %
% 4 blue     off      ll corn  1          1                                  %
%  --------------------------------------------------------------------      %
%            x      y     DXs   DYs   DXe   DYe   rad    type %
ArcCtrClose ( 0.416, 0.3), 0.18, 0.32, 0.48, 0.25, 0.075, pie;
```

% Box 17 - ELLIPSE %
    FillColr 9;
    HatchIndex 4;
    EdgeColr 6;
    EdgeVis ON;

```
% CLOSED FIGURE PARAMETER SUMMARY --------------------------------------------- %
% INTERIOR   FILL     HATCH    PATTERN     EDGE      EDGE     EDGE          %
% STYLE      COLOUR   INDEX    INDEX       BUNDLE    TYPE     WIDTH         %
% set        set      set      default     INDEX     default  set           %
% HATCH      9 orange 4\\\     1           def = 1   1        2.0           %
%                                                                           %
% EDGE       EDGE     FILL REF CHAR SET    ALT CHR                          %
% COLOUR     VISIBIL. POINT    INDEX       SET NDX                          %
% set        set      default  default     default                         %
% 6 magenta  on       ll corn  1           1                               %
% -------------------------------------------------------------------------- %
Ellipse (0.5833331,0.30),0.518,0.24,0.55,0.32;
```

% Box 18 - ELLIPTICAL ARC %
```
    LineWidth 6.0;
    LineType 1;
    % LINE Parameter Summary --------------------------------------- %
    % BUNDLE    LINE      LINE       LINE            %
    % INDEX     TYPE      WIDTH      COLOUR          %
    % default   set       set        set            %
    % 1         1         6.0        3 green         %
    % --------------------------------------------------- %
    EllipArc  (0.6800000,0.28),            % centre point       %
              (0.5846666,0.19),            % 1st CDP endpoint    %
              (0.5966666,0.31),            % 2nd CDP endpoint    %
              (0.04, 0.11),                % DX_start,DY_start   %
              (0.10,-0.09);                % DX_end,DY_end       %
```

% Box 19 - ELLIPTICAL ARC CLOSE (PIE) %
```
    FillColr 3;
    HatchIndex 2;
    EdgeWidth 4.0;
    % CLOSED FIGURE PARAMETER SUMMARY ------------------------------------- %
    % INTERIOR   FILL     HATCH    PATTERN     EDGE      EDGE     EDGE        %
    % STYLE      COLOUR   INDEX    INDEX       BUNDLE    TYPE     WIDTH       %
    % set        set      set      default     INDEX     default  set        %
    % HATCH      3 green  2 | | |  1           def = 1   1        4.0        %
    %                                                                        %
    % EDGE       EDGE     FILL REF CHAR SET    ALT CHR                       %
    % COLOUR     VISIBIL. POINT    INDEX       SET NDX                       %
    % set        set      default  default     default                      %
    % 6 magenta  on       ll corn  1           1                            %
    % ----------------------------------------------------------------------- %
    EllipArcClose (0.85,0.28),            % centre point        %
                  (0.75,0.19),            % 1st CDP endpoint     %
                  (0.76,0.31),            % 2nd CDP endpoint     %
                  (0.04, 0.12),           % DX_start,DY_start    %
                  (0.10,-0.08),           % DX_end,DY_end        %
                  pie;
```

% Box "20" - LINE TYPE %
    LineColr 2;
    Linewidth 2.0;
    LineType 5;
    % LINE Parameter Summary -- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	5 dash-dot-dot	2.0	2 red	%
% ---				%

    Line (0.05,0.02),(0.6,0.02);

    LineType 4;
    % LINE Parameter Summary -- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	4 dash-dot	2.0	2 red	%
% ---				%

    Line (0.05,0.03),(0.6,0.03);

    LineType 3;
    % LINE Parameter Summary -- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	3 dot	2.0	2 red	%
% ---				%

    Line (0.05,0.04),(0.6,0.04);

    LineType 2;
    % LINE Parameter Summary -- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	2 dash	2.0	2 red	%
% ---				%

    Line (0.05,0.05),(0.6,0.05);

    LineType 1;
    % LINE Parameter Summary -- %

% BUNDLE	LINE	LINE	LINE	%
% INDEX	TYPE	WIDTH	COLOUR	%
% default	set	set	set	%
% 1	1 solid	2.0	2 red	%
% ---				%

    Line (0.05,0.06),(0.6,0.06);

```
% Labels in Boxes %
    TextFontindex 3;
    TextPrec STROKE;
    CharExpan 0.8;
    CharSpace 0.10;
    TextColr 1;
    CharHeight 0.015;
    CharOri 0.0,1.0,1.0,0.0;
    TextPath RIGHT;
% TEXT PARAMETER SUMMARY -------------------------------------------- %
% BUNDLE   FONT     TEXT       EXPAN    CHAR.    TEXT              %
% INDEX    INDEX    PRECISION  FACTOR   SPACE    COLOUR            %
% default  set      set        set      set      set               %
% 1        3        STROKE     0.8      0.10     1 black           %
%                                                                  %
% CHAR     CHAR.    TEXT       TEXT     CHAR SET ALT CHAR          %
% HEIGHT   ORIENT   PATH       ALIGN    INDEX    SET INDEX         %
% set      set      set        default  default  default           %
% 0.015    0,1,1,0  right      normal   1        1                 %
% -------------------------------------------------------------------- %
    Text    0.0050000,0.7500000,    final,    "(1) POLYLINE";
    Text    0.1716666,0.7500000,    final,    "(2) DISJOINT";
    Text    0.1716666,0.7300000,    final,    " POLYLINE";
    Text    0.3383333,0.7500000,    final,    "(3) POLYMARKER";
    Text    0.5050000,0.7500000,    final,    "(4) TEXT";
    Text    0.6716666,0.7500000,    final,    "(5) RESTRICTED";
    Text    0.6716666,0.7300000,    final,    " TEXT";
    Text    0.8383333,0.7500000,    final,    "(6) APPEND";
    Text    0.8383333,0.7300000,    final,    " TEXT";
    Text    0.0050000,0.4500000,    final,    "(7) POLYGON";
    Text    0.1716666,0.4500000,    final,    "(8) POLYGON";
    Text    0.1716666,0.4300000,    final,    " SET";
    Text    0.3383333,0.4500000,    final,    "(9) CELL";
    Text    0.3383333,0.4300000,    final,    " ARRAY";
% Not Included -------- (10) GENERALIZED DRAWING PRIMITIVE (GDP) - %
    Text    0.5050000,0.4500000,    final,    "(11) RECTANGLE";
    Text    0.6716666,0.4500000,    final,    "(12) CIRCLE";
    Text    0.8383333,0.4500000,    final,    "(13) CIRCULAR";
    Text    0.8383333,0.4300000,    final,    " ARC 3 POINT";
    Text    0.0050000,0.1500000,    final,    "(14) CIRCULAR";
    Text    0.0050000,0.1300000,    final,    " ARC 3 POINT";
    Text    0.0050000,0.1100000,    final,    " CLOSE";
    Text    0.1716666,0.1500000,    final,    "(15) CIRCULAR";
    Text    0.1716666,0.1300000,    final,    " ARC CENTRE";
    Text    0.3383333,0.1500000,    final,    "(16) CIRCULAR";
    Text    0.3383333,0.1300000,    final,    " ARC CENTRE";
    Text    0.3383333,0.1100000,    final,    " CLOSE";
    Text    0.5050000,0.1500000,    final,    "(17) ELLIPSE";
    Text    0.6716666,0.1500000,    final,    "(18) ELLIPTICAL";
    Text    0.6716666,0.1300000,    final,    " ARC";
    Text    0.8383333,0.1500000,    final,    "(19) ELLIPTICAL";
    Text    0.8383333,0.1300000,    final,    " ARC CLOSE";
    Text    0.05,0.072,              final,    "LINE TYPE";
```

CharHeight 0.007;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	set	set	set	set	%
% 1	3	STROKE	0.8	0.10	1 black	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 0.007	0,1,1,0	right	normal	1	1	%
%						%

Text (.0229,.060),final,"1.";
Text (.0229,.050),final,"2.";
Text (.0229,.040),final,"3.";
Text (.0229,.030),final,"4.";
Text (.0229,.020),final,"5.";

% Figure Label %

CharHeight 0.015;

% TEXT PARAMETER SUMMARY						%
% BUNDLE	FONT	TEXT	EXPAN	CHAR.	TEXT	%
% INDEX	INDEX	PRECISION	FACTOR	SPACE	COLOUR	%
% default	set	set	set	set	set	%
% 1	3	STROKE	0.8	0.10	1 black	%
%						%
% CHAR	CHAR.	TEXT	TEXT	CHAR SET	ALT CHAR	%
% HEIGHT	ORIENT	PATH	ALIGN	INDEX	SET INDEX	%
% set	set	set	default	default	default	%
% 0.015	0,1,1,0	right	normal	1	1	%
%						%

Text 0.67333333,0.0800000,final,"CALS TEST NETWORK";
Text 0.67333333,0.0570000,final,"MIL-D-28003";
Text 0.67333333,0.0340000,final,"Computer Graphics Metafile";
Text 0.67333333,0.0110000,final,"File: CTN-01Rd, 91-10-03";

EndPic;
EndMF;

ATTACHMENT G   Glossary

Clear Text: One method for encoding a CGM, the other two being character encoding and binary. Of the three encodings, clear text is the most like English, and is thus easier for people to read than the number-oriented binary and character encodings. Multiple encodings exist as trade-offs between short file size and human readability. To be compatible with MIL-D-28003, a CGM must eventually be in binary format.

Computer Graphics Metafile: The specification, as designated in ANSI/ISO 8632, for storing and transferring two-dimensional picture (lines and shapes) data.

Element: A functional item that can be used to construct a picture or convey information. Examples are a circle, a line, a color, a linewidth, and text.

MIL-STD-1840A: Military Standard, "Automated Interchange of Technical Information." This standard defines methods for the digital transmission of technical information necessary for the logistic support of weapons systems throughout their life cycle. MIL-STD-1840A acts as the "parent" standard for a suite of specifications, including MIL-D-28003 (CGM).

MIL-D-28003: Military Specification, "Digital Representation for Communication of Illustration Data: CGM Application Profile." This specification establishes requirements for digital delivery of 2-dimensional vector images via the digital format of the CGM (Computer Graphics Metafile). MIL-D-28003 is a subset of the ANSI/ISO 8632 standard.

Pixel: Picture Element. A computer screen displays a picture as a series of discrete rectangles or squares called pixels. Each pixel, the smallest unit of picture display, contains only one color-shaded value. Complex images can be formed, building upon the simple pixel, since the human eye tends to blend the colors into a continuous image.

Raster Data: Image data stored (and transmitted) as a regular 2-D array of pixels.

Vector Data: Image data stored (and transmitted) as lines. In the case of CGM, vector image data need not be limited to straight line segments, but may also consist of graphical elements such as circles, and arcs, defined by mathematical equations.

ATTACHMENT H   List of Acronyms and Abbreviations

ANSI: American National Standards Institute

ASCII: American Standard Code for Information Interchange

CALS: Computer-aided Acquisition and Logistic Support

CGM: Computer Graphics Metafile

CTN: CALS Test Network

DoD: Department of Defense

ISO: International Organization for Standardization, commonly known as
                         International Standards Organization in the United States

MIL-STD-1840A: Military Standard, "Automated Interchange of Technical Information"

MIL-D-28003:   Military Specification, "Digital Representation for Communication of
                         Illustration Data: CGM Application Profile"

Pixel: Picture Element

2-D: Two-dimensional